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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/768,092	02/02/2004	Kozo Makiyama	020212A	8674
38834	7590	03/27/2006	EXAMINER	
WESTERMAN, HATTORI, DANIELS & ADRIAN, LLP 1250 CONNECTICUT AVENUE, NW SUITE 700 WASHINGTON, DC 20036			POMPEY, RON EVERETT	
			ART UNIT	PAPER NUMBER
			2812	

DATE MAILED: 03/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/768,092	Applicant(s) MAKIYAMA ET AL.	
	Examiner Ron E. Pompey	Art Unit 2812	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 30 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 7-11 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3, 5 and 6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 10/084,924.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-3, 5-6, and 12-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoshida (US 5,712,175), in view of Furukawa et al. (US 6,387,783) and in further view of Sasaki et al. (US 6,180,528).

Yoshida discloses the limitations of:

(a) preparing a semiconductor substrate having current input/output regions (2a, 2b, fig. 1);

(c) forming a resist laminate (6 and 3, fig. 7) on the insulating layer;

(d) forming an upper opening through an upper region (6a, fig. 7) of the resist laminate, the upper opening having a laterally broadening middle space;

(e) forming a lower opening (5, fig. 5) through a lower region of the resist laminate, the lower opening communicating the upper opening, having a limited size along a current direction, and having generally vertical sidewalls;

(g) performing a heat treatment of the resist laminate to deform the side walls (3b, fig. 6) of the lower opening so that at least one of opposite ends of the lower region of the resist at the lower opening is retarded from a corresponding end of the insulating

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layer and that the lower opening of the resist has a forward taper shape upwardly and monotonically increasing a size of the lower opening along the current direction;

(h) filling a gate electrode stem in the gate electrode opening and the lower opening and forming a head (7, fig. 8) in the upper opening, the head having an expanded size along the current direction;

wherein the heat treatment in said step (g) makes the opposite side walls of the lower opening facing in the current direction have a generally symmetric taper shape and be retarded from opposite ends of the insulating layer (col. 3, ln. 39 – col. 4, ln. 22).

3. Yoshida reads on the claims as applied above, but does not disclose the claimed limitation(s) of:

(b) forming an insulating layer on the semiconductor substrate, said insulating layer covering said current input/output regions;

(f) etching the insulating layer exposed in the lower opening to form a gate electrode opening exposing the semiconductor substrate;

a plurality of element regions;

applying an energy beam to a lower region of said resist laminate in at least part of said plurality of element regions at a different dose depending on the element region;

and

wherein the heat treatment in said step (g) is performed at a temperature lower than a glass transition temperature of the lower region of the resist laminate..

However,

a. Furukawa discloses the above claimed limitations regarding:  
forming an insulating layer (111, fig. 2A) covering said current input/output regions (col. 3, lns. 10 - 15);  
performing a heat treatment on the lower resist at a temperature lower than a glass transition temperature in column 3, ln. 65 – col. 4, ln. 4.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Furukawa with Yoshida, because the insulating layer will aid in the adhesion of the photoresist to the input/output regions and the heat treatment will cure the sheet and improve precision during etching.

b. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make more than one element since it has been held that mere duplication of essential working parts of a device involves only routine skill in the art. *St. Regis Paper Co. v. Bemis Co.*, 193 USPQ 8.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention that more than one element could be formed simultaneously to allow faster production of devices.

Also, It would have been obvious to one of ordinary skill in the art at the time the invention was made to use different doses on the lower resist region, because the different doses provide for precise tailoring of opening dimensions, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only ordinary skill in the art. *In re Aller*, 105 USPQ 233.

***Response to Arguments***

2. Applicant's arguments with respect to claims 1-3, 5-6 and 12-13 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

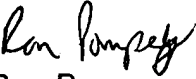
3. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E. Pompey whose telephone number is (571) 272-1680. The examiner can normally be reached on compressed.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael S. Lebentritt can be reached on (571) 272-1873. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Ron Pompey  
AU: 2812  
March 15, 2006

 3/16/06  
Primary Examiner  
AU 2812